ENVIRONMENTAL ASSESSMENT

SHOOTING WHITE-TAILED DEER TO CONTRIBUTE TO

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Animal and Plant Health Inspection Service

Cooperating Agency

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TABLE OF CONTENTS

1.0 CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS)[1] program is authorized by Congress to manage a program to reduce human/wildlife conflicts. WS's vision is to improve the coexistence of people and wildlife, and its mission is to provide Federal leadership in managing problems associated with wildlife. WS's activities are directed at the protection of America's agricultural, industrial and natural resources, and to safeguard public health and safety. This is accomplished through:

- Training of wildlife damage management professionals
- Development and improvement of strategies to reduce economic losses and threats to humans from wildlife
- Collection, evaluation, and dissemination of management information
- Cooperative wildlife damage management programs
- Informing and educating the public on how to reduce wildlife damage and
- Providing data and a source for limited-use management materials and equipment, including pesticides

This Environmental Assessment (EA) evaluates ways by which this responsibility can be carried out by WS in responding to a request from the New Jersey Division of Fish and Wildlife (Division) to assist them in achieving their white-tailed deer (*Odocoileus virginianus*) population reduction objectives in eight west-central NJ deer management zones. The population reduction objectives for these zones were developed by the Division in response to agricultural crop damage, deer-vehicle collisions, natural habitat destruction, and damage to landscaping. In agricultural areas, New Jersey Public Law 2000, Chapter 46 enables responsible authorities such as County Boards of Agriculture to apply to the Division to designate special deer management areas where crop damage is attributable to an overpopulation of deer. The law also allows for the development of community based deer management plans that provide for participating entities such as WS to use alternative control methods to achieve deer population reductions.

WS is a cooperatively funded, service oriented program. Before any operational wildlife damage management is conducted, *Agreements for Control of Animals* are completed by WS and the land owner/administrator. WS cooperates with private property owners and managers and with appropriate land and wildlife management agencies, as requested, with the goal of effectively and efficiently resolving wildlife damage-related problems in compliance with all applicable Federal, State, and local laws. WS uses an integrated wildlife damage management (IWDM) approach, as

[1]As of August 1, 1997, the name of the USDA, APHIS Animal Damage Control (ADC) Program was changed to Wildlife Services (WS). All references to ADC are considered synonymous to WS.

described in the Final Environmental Impact Statement (FEIS) developed by WS for the national WS program (USDA 1994). WS uses and recommends appropriate legal, effective, practical, and environmentally acceptable methods to address wildlife damage problems. IWDM provides a means of reducing future losses or damage associated with or caused by wildlife.

WS consists of operations and research capabilities. The majority of the program's research is conducted by the WS National Wildlife Research Center through its central location in Fort Collins, CO and its research field stations around the country. WS's operational work is conducted through its two regional offices (Lakewood, CO and Raleigh, NC) and State/District offices in the fifty states. The WS State Office in NJ administers the WS program for NJ and PA, and its work consists primarily of technical and operational assistance to reduce migratory bird damage (ie. Canada geese, blackbirds, gulls). Assistance is provided for mammal damage management pursuant to funded contracts and permit, authorizations, and requests from state wildlife management agencies and affected individuals, organizations, and agencies. Nationwide, WS conducts operational mammal damage management programs and projects in cooperation with State wildlife management and agriculture agencies to reduce damage associated with white-tailed deer, black bear, coyote, beaver, and other mammals. In the eastern US, WS conducts operational deer damage management projects and programs in cooperation with states to protect property, agriculture, natural resources and human health and safety.

In November, 1999, the WS program in NJ received a letter from the Division (Appendix B) requesting that WS biologists supplement the Division's deer damage management program by conducting site specific deer population reduction operations in selected deer management zones where: 1. hunting and shooting of deer by farmers had not achieved the Division's harvest objective, and 2. the farmer/landowner grants written consent to WS. The Division requested that WS shoot deer in areas where there has been chronic deer damage to agriculture, and where regulated deer hunting and shooting pursuant to permits have not sufficiently reduced the deer population. These means would include shooting during day and night, 6 days per week (Monday-Saturday), and using authorized legal tools and techniques to maximize the efficient take of deer. WS has prepared this EA to assist in evaluating deer population management assistance to the Division, and to communicate with the public the analysis of potential impacts for issues of concern in relation to alternative means of meeting deer population objectives. This analysis covers WS's consideration of deer damage management assistance to the Division and to County Boards of Agriculture for the year 2000 and beyond, depending upon subsequent requests for assistance from the Division and the agricultural community (farmers, County Boards of Agriculture, etc.). Subsequent requests would be based on the Division's analysis of deer populations, deer damage to agricultural crops, and the results/effectiveness of WS-conducted deer management operations.

1.2 PURPOSE

The purpose of this EA is to analyze the alternatives and potential impacts of shooting deer in response to a request from the Division to assist them in achieving their deer population reduction

objectives in eight deer management zones in NJ.

1.2.1 New Jersey Division of Fish and Wildlife's Integrated Deer Management Program.

1.2.1.1 Program Goals.

In NJ, the authority and responsibility for managing the State's freshwater fish and wildlife resources that are classified as fur bearers and game species (including white-tailed deer) has been given by legislative mandate to the NJ Fish and Game Council and the NJ Division of Fish and Wildlife. The Division's Deer Management Program is directed toward achieving the following goals (Burke and Burnette 1998):

- To maintain a healthy deer population on suitable habitat throughout the state
- To maintain deer densities that are compatible with land uses, and
- To maximize the recreational and economic benefits derived from this renewable natural resource

Biological carrying capacity is generally referred to as the number of animals that an area can support in good condition over an extended period of time. It is determined by the quality and quantity of food, water, and cover within the area. Cultural carrying capacity is the number of deer that can coexist compatibly with local human populations (Decker and Purdey 1988, Ellingwood and Spignesi 1986). In NJ, the Division manages the statewide deer population through establishment of harvest and population objectives (increase, decrease, stabilize) within deer management zones. Annually, the Division considers cultural carrying capacity of deer and other factors in the determination of deer management objectives for each zone. New Jersey's human population growth, and the increasing prevalence of urban/suburban landscapes in previously rural areas, may affect cultural carrying capacity for deer, but management of these large-scale social circumstances is outside of the Division's authority. The threshold of wildlife damage acceptance is one of the primary limiting factors in determining cultural carrying capacity. The Division evaluates the nature and extent of deer-vehicle collisions, agricultural and other property damage and other factors in determining deer population strategies. Values associated with white-tailed deer and their management are diverse and extensive, and include consumptive and nonconsumptive uses. The Division's management goals for deer emphasize the importance of deer to all citizens of New Jersey, and support a wide variety of values.

Early deer management efforts in the US, including NJ, were directed at protection of deer from unregulated exploitation, and towards the goal of population increase (Burke et al. 1990). Through the 1950's, the

Division's objectives were deer population increases in most zones. In the 1960's, objectives were changing to population stabilization and decreases due to increasing deer-vehicle collisions, crop damage, and other factors. In 1999-2000, deer population decrease or stabilization are the management objectives for all but one zone in the State. The Division is authorized to evaluate changing factors, including collisions, damage, and the public's tolerance/appreciation for deer in its annual determination of the most appropriate population management objective for each zone. Past determinations of objectives and historic population levels do not restrict the choices available to the Division in determining the most appropriate current population objective. Therefore, past objectives of deer population increase do not preclude the Division from selecting population decrease as the preferred objective for 2000 and beyond.

The Division has determined that the deer population should be reduced by approximately 22% on 71% of the deer range within the next 2-5 years. Current deer population levels are anticipated to remain stable on 29% of the deer range. The deer population objective for zones within the proposed project area (zones 5, 7, 8, 10, 11, 12, 14, and 41) is to reduce deer density (Table 1).

1.2.1.2 Abundance and Distribution of Deer.

The statewide minimum autumn pre-hunting population estimate increased from approximately 41,000 in 1968 to approximately 178,600 deer in 1998. Deer are present in 20 of NJ's 21 counties, and occupy almost all undeveloped land that contains suitable deer habitat. The statewide deer population has remained relatively stable in the past few years, although some areas have experienced high local/zone populations (NJDFW 1999). Within the project area, there are 1,172 square miles of deer range, with an autumn (1998) population estimated at 69,465 deer (avg. 59 deer/mi.^{2}) (Table 1).

Overall, the state's deer population is healthy and productive, with statewide reproductive rates of 0.29 for fawns, 1.42 for yearlings, and 1.78 for adults (Burnett et al. 1999). Though the statewide deer population has remained relatively stable for the past several years, significant increases have occurred in the northeastern and west-central portions of the state. These increases are likely due to a number of factors, including: 1. poor hunter access to land occupied by deer, 2. local ordinances limiting hunting and/or discharge and use of firearms and bows, and 3. increased development that restricts harvest and creates "unintentional deer refuges" where hunting is prohibited. In NJ, there are approximately 12,000 reported deer-vehicle collisions each year, with many collisions and near misses going unreported (R. Lund, pers.

comm.).

1.2.1.3 Regulated Deer Hunting.

Regulated deer hunting is one of the most common tools employed by wildlife management agencies to achieve white-tailed deer population goals and objectives. Beginning as early as 1958, the deer population of northern counties had reached cultural carrying capacity, and extensive crop damage was occurring (Howard 1972). An investigation conducted by the Division in 1958-9 concluded that the NJ deer population was at or above cultural carrying capacity, and that control measures should be taken to reduce deer damage and better use the resource (Mangold 1967). Hunting has been the primary factor employed to control NJ's deer population since at least the 1960's. If left unchecked, the deer population could actually be substantially larger within a few years (NJDFW 1998). Although there are some local areas where access and other factors have limited the extent to which hunting has achieved population objectives for reduction, it has been successful in preventing what otherwise would have been a rapid growth of the statewide deer population.

The Division manages deer within deer management zones (Appendix C). Annually, the Division determines population goals (increase, stabilize, decrease) for each of NJ's deer management zones. Current Division objectives are to stabilize the deer population in 17 zones, decrease in 46 zones, and increase in 1 zone. Regulations and hunting season formats are developed to achieve these goals. Principal factors considered in recommending deer population reduction include the incidence of deer damage to agricultural crops and ornamental plants. In many areas, and where access is not a problem, regulated deer hunting is the most effective means of deer population management. Currently, there are an estimated 90,000-100,000 deer hunters in NJ. There are six deer hunting seasons in NJ: Fall Bow, Permit Bow, Six-Day Firearm, Muzzleloader, Permit Shotgun, and Winter Bow. The Division reports the number of deer taken during the six seasons for each deer management zone. During the 1999-2000 deer seasons, 75,398 deer were taken by hunters, including 36,041 from the proposed project area (48 % of all deer taken in NJ during regulated deer hunting seasons) (Table 1).

In response to increasing deer densities and associated deer-human conflicts, the Division has continued to expand deer hunting opportunities to increase the total and antlerless segment of the annual harvest. Regulatory efforts to increase the antlerless harvest have included: 1. increasing the number of hunting days, 2. additional tags for taking antlerless deer, 3. expanded daily and seasonal bag limits, 4. a requirement to take an antlerless

deer before an antlered deer during 5 of the 6 seasons (six-day firearm season excepted), and 5. limiting hunters to 1 buck per season . For example, the 1967 NJ deer season provided for 3 seasons, 36 hunting days, and a bag limit of 3 deer. In contrast, the 1999-2000 season provided for 6 seasons, 116 hunting days, and an unlimited bag limit for antlerless deer in most zones. In 1967, deer hunters reported a harvest of 9,846 deer (2,952 antlerless), while in 1999, hunters reported a record harvest of 75,398 deer (53,363 antlerless). Farmer deer (hunting) permits are issued free to farmers and their immediate family members, and authorize deer hunting on land they own or lease for agricultural purposes during all open deer seasons.

1.2.1.4 Wildlife Control Unit.

The Division's Wildlife Control Unit (WCU) is a staff of 9 wildlife biologists, technicians and support personnel who carry out many of the Division's wildlife control program activities. In addressing deer damage management, the WCU provides technical assistance on wildlife control techniques and approaches, issues Permits to Kill Wild Deer to farmers, and administers fencing and repellent distribution programs. Technical assistance is ongoing and consists of information delivered over the telephone, through the mail, and via personal consultations. The WCU handles approximately 800-900 calls regarding deer damage each year.

Permits to kill wild deer are available year round, pursuant to regulation. Approximately 500-600 such permits are issued each year, resulting in the shooting of approximately 2,600-4,200 deer statewide. Horton and Craven (1997) noted that judicious use of shooting permits in conjunction with hunting of antlerless deer and other control techniques may result in significant reduction of agricultural crop losses to deer. Shooting deer pursuant to permit is different from hunting deer during hunting seasons. The goal of the permit program is to protect farmers' crops by shooting deer involved in the damage situation. The activities are conducted by the permittee and his/her agents, using specialized tools and techniques. Hunting is conducted by licensed hunters pursuant to hunting regulations, and the primary objectives are sport and acquisition of food. Typically, hunting is accomplished with limited tools and techniques, whereas shooting to control damage is conducted with a wide range of available tools and techniques designed to maximize effectiveness and efficiency.

Nonlethal methods such as fencing and repellents are employed in NJ within the context of comprehensive deer management programs. The effectiveness of repellents and electric fencing is highly variable and is usually dependent on deer density (Ellingwood and Caturano 1988). Exclusive use of nonlethal methods such as exclusion, harassment and repellents usually results in

increased deer damage on adjacent areas. Each year, the Division purchases and distributes repellents provided for by a designated (but finite) fund that is set aside for this purpose ($12,000-$15,000 in 1999). Currently, supply typically meets demand. The WCU distributes repellents to farmers and other landowners experiencing deer damage. Approximately 600 gallons of Hinder (active ingredient ammonium soaps of higher fatty acids) and Magic Circle (active ingredient Thiram) are distributed annually. Magic Circle cannot be applied to edible crops, and is typically applied to turf, trees, flowers, and shrubs. Hinder is typically applied to nursery stock, ornamentals, vegetable and field crops and home gardens. It is applied over the entire target area, or as a perimeter treatment.

In 1998, the NJ Department of Agriculture's Deer Fencing Grant Program made $300,000 available for NJ farmers to receive free mesh wire fencing material for the protection of crops from deer damage. The Division's WCU administers the distribution of this "permanent" (20-year expected life span) fencing material, and has completed the distribution of more than 4890 rolls of mesh fence and 467 rolls of smooth wire to more than 150 farmers. High-value, low acreage crops were those primarily identified for protection: vegetables (32% of farmers), nursery stock (33%), orchards (7 %), cranberries (5%), and others (flowers, blueberries, grapes, etc.).

The WCU also recommends, and NJ farmers commonly use, pyrotechnics and propane cannons to harass deer away from crops. Pyrotechnics are noise-making devices shot out of 12 ga. shotguns (range to 100 yards) or pistol launchers (range 30-50 yards). Propane cannons are machines that create loud noises at timed intervals, and are powered by propane. In NJ, a state permit is required in order to legally use a propane cannon to reduce wildlife damage to agriculture.

In addition to the deer damage management program, the WCU also conducts damage management programs for other mammals (beaver, coyote, black bear, etc.) and birds.

1.2.1.5 Community Based Deer Management Program.

Under the Community Based Deer Management Program, the Division cooperates with municipal, county, State, and Federal agencies and other responsible entities (municipalities, airports, county Boards of Agriculture) to develop and implement alternative control methods for use in environments where traditional hunting programs are not an option or where hunting programs alone cannot achieve the desired level of deer population reduction (Lund 1997). The program allows for the use of non-traditional methods to reduce deer populations, including shooting deer by agents of a responsible

authority (permittee), live capture and euthanize**,** live capture and relocate to a research facility or commercial deer farm, and the experimental use of fertility control methods. Recently-enacted legislation (P.L. 2000, Chapter 46, C.23:4-42.3-7) regarding the Community-Based Deer Management Program provides for the use of alternative control methods such as suppressed rifles, in special deer management areas proposed by applicants, pursuant to a series of approvals at municipal, county, and State levels. The Division provides technical assistance in the development, implementation, and evaluation of management plans. All substantive costs are borne by the cooperator. Regarding agricultural crop damage from deer, pursuant to C.23:42.2-7, a county board of agriculture may apply to the Division for designation of a special deer management area, and develop a community based deer management plan. The plan is submitted to the Division, and includes sufficient detail regarding boundaries, methods, safety precautions, landowner consent, supporting municipal resolutions, public notification, and a description of the organization that will implement control methods. Upon approval by the Division, the plan is submitted to the Fish and Game Council for its review and action. Upon final approval by the Council, the Division may issue a permit to the applicant (County Board of Agriculture), which identifies authorized control methods, procedures, and personnel.

1.2.1.6 Governor's Report on Deer Management in New Jersey.

In 1997, Governor Whitman directed the Division to consult with the NJ Department of Agriculture in performing a comprehensive analysis of the State's deer population. The analysis was completed in 1999, and included the current status of NJ's deer population, a description of the current deer management program, identification of current problem areas, a description of factors contributing to deer overabundance, recommendations to reduce deer-human conflicts, and other pertinent information (NJDEP 1999). Recommendations regarding crop damage control include: 1. make the Community-Based Deer Management program available to agricultural areas, 2. liberalize hunting regulations to better achieve zones' deer population objectives, and 3. increase hunter access to lightly-hunted and/or closed properties.

1.2.2 Deer Damage to New Jersey Agriculture

A survey of NJ farmers regarding 1997 crop losses to deer was conducted by Rutgers' New Jersey Agricultural Experiment Station (NJAES) Center for Wildlife Damage Control (Rutgers 1998). The survey sampled 4,403 New Jersey farm operators whose reported annual farm sales were greater than $10,000. The survey was responded to by 51% (2,142 farm operators) of the recipients. Respondents indicated that deer were responsible for 70% of

the crop damage associated with wildlife on land they farmed. Of those farmers reporting damage, 39% reported it to be intolerable to the point of taking additional action to resolve the problem. Responding farmers spent $620,000 on deer control, with 25% reporting abandonment of tillable ground, and 36% ceasing to grow certain crops due to deer damage. Total annual crop losses for 1997 reported by respondents were between $5 and $10 million.

The nature of deer damage to agriculture in NJ varies depending on many factors, including location, local deer densities, crop type and availability, and proximity and size of adjacent unhunted areas. In January 1999, west-central NJ was identified by the State Board of Agriculture, the Hunterdon County Board of Agriculture, municipalities, and individuals as having severe levels of deer damage to agricultural crops. This area includes Hunterdon County and portions of Warren, Somerset, Morris, Sussex and Mercer Counties, which are located within 8 deer management zones. In March of 2000, aerial infrared deer surveys of selected NJ sites was conducted. Deer densities from Hunterdon County sample sites ranged from 34 to 191 deer per square mile. The State Board of Agriculture has requested that the Division provide prompt relief for the areas where deer densities had exceeded the cultural carrying capacity, and were causing continued and unacceptable crop depredation.

Crops commonly affected by deer damage in the project area are corn, wheat, soybeans, alfalfa, hay, fruits and vegetables.

1.2.3 The Division's Deer Damage Management Program

To assist NJ farmers in reducing deer damage to crops, the Division conducts and recommends an integrated deer management program. Activities conducted, recommended, and authorized by the Division are those included in the descriptions of Regulated Deer Hunting (Section 1.2.1.3), Wildlife Control Unit (Section 1.2.1.4), and Community Based Deer Management Program (Section 1.2.1.5). Key aspects of the integrated deer damage management program administered by the Division are:

- Increasingly liberalized hunting regulations in deer management zones with high agricultural deer damage
- Issuance of Permits to Kill Wild Deer to NJ farmers experiencing crop losses to deer
- Issuance of Noise Maker Permits to NJ farmers to authorize use of propane cannons to protect crops
- Distribution of repellents and fencing materials

- Distribution of technical information on deer damage management techniques
- Authorization of alternative deer control methods pursuant to the Community Based Deer Management Program

On individual farms experiencing deer damage to crops, farmers conduct integrated deer damage management programs that most likely include, but are not necessarily limited to, some or all of these elements: use of repellents, fencing and harassment tools and methods, implementation of deer hunting, shooting of deer by farmers and their agents pursuant to Permits to Kill Wild Deer issued by the Division, and other tools, methods, and approaches. In certain circumstances, where chronic deer damage problems are occurring that are associated with very high local deer densities, farmers are no longer capable of expending the time and other resources needed to accomplish population reduction objectives.

1.3 NEED FOR ACTION

1.3.1 Area Description and Need for Project

The project area consists of eight deer management zones (5, 7, 8, 10, 11, 12, 14, and 41) in west-central NJ, located in Hunterdon, Mercer, Morris, Somerset, Sussex, and Warren Counties (Appendix C). The landscape is rolling hills interspersed with small wooded areas, agricultural fields, and, increasingly, areas of human development. Small grains (corn, soybeans and wheat) and fruit orchards are the primary agricultural crops grown in the area. Hay is becoming more common, in part due to deer damage to other, more-preferred crops. Farmers own relatively small parcels, and farm operations typically occur on a combination of owned and rented land. Hunting rights may remain under the control of the landowner for the purpose of maximizing income from hunting, not necessarily to reduce crop damage. In these cases, hunting leases may be expensive, hunting pressure is relatively light, and access is limited. Restrictive access and the proliferation of “unintentional” deer refuges resulting from increased human development and/or landowner restrictions often renders traditional deer damage control approaches problematic.

The Division’s deer management objective of population reduction (Table 1) for the eight zones of the proposed project area have been difficult to achieve using traditional methods. Additionally, local deer populations in areas of high deer damage to agriculture have, in many places, exceeded the capacity of farmers to remove adequate numbers of deer within their time and financial constraints.

1.3.2 Summary of Proposed Action

The Proposed Action is for WS to shoot deer to contribute to deer population reduction objectives in eight deer management zones in NJ. In most cases, WS shooting of deer would occur as part of community based deer management plans for special deer management areas as described in NJ P.L. 2000, Chapter 46 (C.23:4-42.3-.7). Under the Proposed Action, WS biologists would supplement ongoing deer damage management programs by shooting deer pursuant to Division-issued permits granted to County Boards of Agriculture. The only difference between the No Action and Proposed Action alternatives is that WS personnel would also shoot deer, and would do so pursuant to Division-issued permits, requests from County Boards of Agriculture, and written farmer/landowner consent. WS shooting of deer would occur in deer management zones 5, 7, 8, 10, 11, 12, 14, and 41 where regulated hunting and farmer shooting of deer had not removed an adequate number of deer to meet the zones' population objectives of reduction. If and when deer removal by WS is conducted pursuant to special deer management permit in a designated special deer management area under the Community Based Deer Management Program, appropriate procedures and authorizations, as described in the legislation, and the area's deer management plan, would be complied with. Shooting would be conducted from elevated positions. Alternative control methods would be employed, such as specialized equipment (firearms) to optimize safety, humaneness, and efficiency. The number of deer shot by WS biologists would be reported to the Division daily. This would ensure that the Division could constantly monitor take compared to the management objective for each zone. At any time, as the Division may direct, WS would cease or modify methods of shooting of deer. Additionally, the County Board of Agriculture, or the farmer/landowner may similarly direct WS shooting of deer to be discontinued or modified. Under the Proposed Action, all other deer damage management activities as described in Section 1.2.3 (The Division's Deer Damage Management Program) could continue to occur, and would typically include hunting, shooting (under permit), fencing, harassment, repellents, and other tools and methods. The only new addition to the program would be WS's participation in shooting deer. Safe operation of vehicles, firearms, and all other tools, techniques, and approaches would be the program's top priority.

Other aspects of the Proposed Action include:

1. WS biologists would be listed by name on Division-issued permits to County Boards of Agriculture.
2. Farmer/landowner consent would be obtained prior to WS shooting of deer.
3. WS biologists would shoot deer up to 6 days a week (Monday-Saturday), during the day and night, using authorized legal tools and techniques. In most cases, WS shooting of deer would occur during February-March. Additionally, more-restrictive Division/County Board of Agriculture/Township/farmer/landowner preferences regarding time, day, duration, and other specifications of the proposed action would be honored.
4. Shooting would be from elevated positions (stands, stationary vehicles, etc.) in order to maximize safety and efficiency.

5. WS shooting of deer would not occur during the regulated deer hunting seasons.

Additionally, the agricultural community or other entity would develop and conduct procedures to maximize the extent to which venison is donated to charitable organizations.

1.4 RELATIONSHIP OF THIS ENVIRONMENTAL ASSESSMENT TO OTHER ENVIRONMENTAL DOCUMENTS

WS conducted a NEPA process and developed a Final Environmental Impact Statement (FEIS) on the national APHIS/WS program (USDA 1994). The FEIS contains detailed discussions of potential environmental impacts from various wildlife damage management methods. CEQ regulations for implementing NEPA authorize agencies to eliminate repetitive discussions of issues addressed in programmatic documents by tiering to the broader document (CFR 1500.4(I);1502.20). Therefore, this EA is tiered to the FEIS, and pertinent information available in the FEIS has been incorporated by reference into this EA. The FEIS may be obtained by contacting: USDA APHIS WS Operational Support Staff, 4700 River Rd., Unit 87, Riverdale, MD 20737-1234.

1.5 DECISIONS TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should WS shoot deer on select NJ farms to contribute to deer population reduction objectives in New Jersey?
- What mitigation measures should be implemented?
- Would the proposed action have significant impacts requiring an EIS analysis?

1.6 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

1.6.1 Actions Analyzed. This EA evaluates alternatives and potential environmental impacts of shooting deer by WS on select farms to contribute to deer population reduction objectives in New Jersey.

1.6.2 Period for Which this EA is Valid. This EA will remain valid until WS determines that new needs for action, new alternatives having different environmental effects, and/or new issues must be analyzed. At that time, this analysis and document will be reviewed and revised as necessary. This EA will be reviewed annually to ensure that it is complete and current.

1.6.3 Site Specificity. This EA analyzes potential impacts of WS's involvement in deer management plans and programs on private and public property in NJ. The standard WS Decision Model (Slate et al. 1992) and WS Directive 2.105 is the decision-making process for determining methods and strategies to use or

recommend for individual actions conducted by WS (See USDA 1994, Chapter 2 and Appendix N for a more complete description of the WS Decision Model and examples of its application). Decisions made using this process will be in accordance with mitigation measures and standard operating procedures described in this EA and adopted or established as part of the decision. WS assistance may be requested by County Boards of Agriculture and farmers/landowners for farms in special deer management areas in Hunterdon, Mercer, Morris, Somerset, Sussex, and Warren Counties, within deer management zones 5, 7, 8, 10, 11, 12, 14, and 41.

1.7 AUTHORITY AND COMPLIANCE

1.7.1 Authority of Federal and State Agencies in Deer Management in New Jersey[2]

1.7.1.1 WS Legislative Authorities

WS is directed by law to protect American agriculture and other resources from damage associated with wildlife. Wildlife damage management is directed at alleviating damage or other problems caused by, or related to, the presence of wildlife. It is an integral component of wildlife management (Leopold 1933, The Wildlife Society 1990, Berryman 1991).

The primary statutory authority for the WS program is the Animal Damage Control Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), which provides that:

"The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, brown tree snakes and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, and birds, and for the protection of stock and other domestic animals through the suppression of rabies and tularemia in predatory or other wild animals; and to conduct campaigns for the destruction or control of such animals. Provided that in carrying out the provisions of this Section, the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions."

[2] See Chapter 1 of USDA (1994) for a complete discussion of federal laws pertaining to WS.

Since 1931, with changes in societal and professional wildlife management values, WS policies and programs place greater emphasis on the part of the Act discussing "*bringing (damage) under control*," rather than "*eradication*" and "*suppression*" of wildlife populations. In 1988, Congress strengthened the legislative authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammal and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

Therefore, conduct of direct management programs to reduce wildlife damage may be conducted by WS pursuant to funded contracts and agreements with other agencies (including State, Federal, County and other governmental agencies), organizations, corporations, groups, and individuals.

1.7.1.2 New Jersey Division of Fish and Wildlife (Division)

Authority for the Division of Fish and Wildlife of the New Jersey Department of Environmental Protection, to manage and conserve New Jersey's wildlife resources is found in New Jersey Statutes Annotated (NJSA) Title 13 (Conservation and Development - Parks and Reservations) and Title 23 (Fish and Game, Wild Birds and Animals). Additionally, the authority for states to determine wildlife damage population objectives and to enter into partnerships with Federal agencies has been affirmed by the courts (Table Case at 952 F.2d 406, 1992 U.S. App. LEXUS 3579).

NJSA 13:1B-30
: Authorizes the Fish and Game Council to adopt and modify reasonable regulations (State Fish and Game Code) regarding wildlife management in NJ.

NJSA 23:4-24.4
: Use of baiting and shooting from an elevated stand or other structure for deer hunting is authorized.

NJSA 23:4-42
: The NJ deer hunting season is authorized, as provided for in the State Fish and Game Code. This section also authorizes the owner or

lessee of land under cultivation, or their designated agents, to kill deer found on land covered by a permit issued by the Division.

NJSA 23:4-42.1

The permittee and designated agents are allowed to kill deer to control crop damage, with the following conditions: 1. Kill either sex deer at any time of day or night, 2. Utilize illuminating devices (spotlight, flashlight, floodlight, headlight), whether portable or fixed to a vehicle, to locate and stun deer, and 3. Be assisted by a driver of a vehicle and by a person operating the illuminating device.

NJSA 23:4-42.2

This section provides for the Division's publication in an annual report of the number of deer killed for crop damage control.

The New Jersey Administrative Code (NJAC) provides regulations, and is annually reviewed and amended through a public process administered by the Division, as authorized in NJSA 13:1B-34. Amended regulations are known as the Fish and Game Code, which implements the statute laws. Pertinent sections of NJAC Fish and Game Code are as follows:

NJAC 7:25-5.23

Provides regulations pertaining to the use of firearms in shooting deer and other wildlife.

NJAC 7:25-23.1 through 23.8

Provides rules governing the killing of deer causing damage to crops, including permit issuance, anticipated damage, possession of permit during control actions, possession of a NJ firearm purchaser ID card, use of 10, 12, 16, or 20 ga. shotguns loaded with slugs or 10 or 12 ga. buckshot, identification of agents, record-keeping, disposition of carcasses, completion of reporting requirements, liability, and penalties.

NJAC 7:25-5.32

The Division is authorized to issue Special Wildlife Management Permits for the taking of game species related to management problems including but not limited to agricultural crop damage. This section also provides for the issuance of Special Wildlife Management Permits to allow the use of alternative deer control methods .

P.L. 2000 Chapter 46, C.23:4-42.3-7

Provides for the availability of a Community Based Deer Management Program whereby owners or operators of airports,

County Boards of Agriculture, and municipalities may apply for special authorizations to conduct deer management activities using alternative control methods and approaches, such as suppressed rifles, etc., within special deer management areas, pursuant to Division-issued permits. For agricultural areas, permits would be issued based on the Division's and the Fish and Game Council's approval of community based deer management plans submitted by County Boards of Agriculture.

1.7.2 Compliance With Other Federal Laws.

Several federal laws authorize, regulate, or otherwise affect WS deer damage management. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

1.7.2.1 National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) of 1969 (42 USC Section 4231 et seq.) is implemented by Federal Agencies pursuant to Council on Environmental Quality (CEQ) Regulations (40 CFR Section 1500-1508) and agency implementing regulations. WS prepares analysis of the potential environmental impacts of program activities to meet procedural requirements of NEPA and to facilitate planning, decision-making, and public and interagency involvement. NEPA and its supporting regulations require that an EA be a concise public document that provides sufficient evidence and analysis to determine if an EIS should be prepared, aids in WS's compliance with NEPA, describes the need for action, alternatives, and environmental impacts, and includes a list of agencies/persons consulted.

1.7.2.2 Endangered Species Act (ESA)

It is Federal policy, under the ESA, that all Federal agencies seek to conserve threatened and endangered (T&E) species and utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). Where appropriate, WS conducts Section 7 consultations with the U.S. Fish & Wildlife Service (USFWS) to ensure that "*any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available*" (Sec.7(a)(2)). WS obtained a Biological Opinion (BO) from USFWS in 1992 describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1994, Appendix F). WS is in the process of initiating formal consultation at the programmatic level to reevaluate the 1992 B.O. and to fully evaluate potential effects on T&E species listed or proposed for listing since the 1992 FWS BO. In addition to these programmatic efforts to comply with

the ESA, individual WS programs may confer with FWS Ecological Services in the State of the proposed action to determine the presence of T&E species in project areas, and to identify potential impacts of proposed actions and alternatives on these species.

1.7.2.3 Executive Order on Environmental Justice

Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires Federal agencies to analyze disproportionately high and adverse environmental effects of proposed actions on minority and low-income populations.

1.7.2.4 National Historic Preservation Act (NHPA) of 1966 as amended

The National Historic Preservation Act (NHPA) of 1966, and its implementing regulations (36 CFR 800), requires Federal agencies to: 1) determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian Tribes to determine whether they have concerns for traditional cultural properties in areas of these Federal undertakings. WS activities as described under the proposed action do not cause ground disturbances nor do they otherwise have the potential to significantly affect visual, audible, or atmospheric elements of historic properties and are thus not undertakings as defined by the NHPA.

1.8 PREVIEW OF REMAINING CHAPTERS

The EA is composed of 5 Chapters and Appendices. Chapter 2 analyzes issues and affected environment. Chapter 3 describes each alternative, those not considered in detail, mitigation and SOP's. Chapter 4 analyzes the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers, persons/agencies consulted, and the nature and extent of public involvement. The Appendices contain references, T&E species lists (Federal and New Jersey), correspondence between State and Federal Agencies regarding impacts of the proposed action, and a map of the proposed project area.

2.0 CHAPTER 2 - ISSUES

Chapter 2 contains discussion of: 1. issues that are addressed in the analysis of alternatives and impacts, and 2. issues not considered in detail (with rationale).

2.1 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

The following issues have been identified as areas of concern requiring consideration in this EA.

- Effects on target deer populations
- Effects on nontarget species populations, including threatened and endangered species
- Effects on human health and safety
- Effects on aesthetics
- Humaneness of shooting deer
- Effects on regulated deer hunting

2.1.1 Effects on Target Deer Populations

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. In the eight deer management zones of the proposed project area, the Division-determined deer population management strategy is that of reduction. The extent to which each of the alternatives contributes towards this strategy is considered a positive impact, and is described.

2.1.2 Effects on Nontarget Species Populations, Including Threatened and Endangered Species

WS, the Division, and the public are concerned about the potential impact of damage management methods and activities on nontarget wildlife, particularly threatened and endangered (T&E) Species. WS's standard operating procedures include measures intended to mitigate or reduce the effects on nontarget species populations and are presented in Chapter 3.

Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of mitigation measures. The Division's Endangered and Nongame Species Program provided a list of State T&E species (Appendix D), and information regarding effects of the proposed action on T&E species and their habitats or ecosystems. FWS Ecological Services has provided a list of Federal T&E species (Appendix E) that occur (or have historically occurred) in NJ. Federally-listed threatened and endangered species in the proposed project area counties in NJ are: bald eagle (*Halaeetus leucocephalus*) (Hunterdon Co.), Indiana bat (*Myotis sodalis*) (Morris Co.), bog turtle (*Clemmys muhlenbergii*) (Hunterdon, Mercer, Morris, Sussex, and Warren

Cos.), small whorled pogonia (*Isotria medeoloides*) (Hunterdon and Sussex Cos.), swamp pink (*Helonias bullata*) (Mercer and Morris Cos.), and dwarf wedgemussel (*Alasmidonta heterodon*) (Sussex and Warren Cos.). Locations (townships) and habitat requirements of each Federal T&E species are contained in Appendix E.

2.1.3 Effects on Human Health and Safety

Some people may be concerned that WS's use of firearms could impact human safety (scaring deer into traffic, accidentally shooting a person, etc.).

2.1.4 Effects on Aesthetics

The effects of alternatives on human affectionate bonds with individual deer and on general aesthetic values of deer vary widely among people. Some deer live in very close proximity to humans, and people in these situations feed deer and/or develop emotional/affectionate attitudes toward the deer. Other people do not develop emotional bonds with individual deer, but experience aesthetic enjoyment from observing them and/or the knowledge of the existence of deer nearby.

Public reaction to wildlife damage and population management is variable because individual members of the public may have very different attitudes toward wildlife. Some individuals that are negatively affected by wildlife support removal or relocation of damaging wildlife. Other individuals affected by the same wildlife may oppose removal or relocation. Individuals unaffected by wildlife damage may be supportive, neutral, or opposed to wildlife removal depending on their individual values and attitudes.

2.1.5 Humaneness and Animal Welfare Concerns.

Research indicates that the public may be willing to accept lethal wildlife management methods if they are humane (i.e., minimize apparent pain and suffering of the target animal) (Kellert 1993, Schwartz et al. 1997). The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife, is an important and complex concept. Wildlife damage management for societal benefits could be compatible with animal welfare concerns, if *" the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process" (Schmidt 1989).* Suffering is described as a *" . . . highly unpleasant emotional response usually associated with pain and distress."* However, suffering *" . . . can occur without pain . . . ,"* and *" . . . pain can occur without suffering . . . "* (AVMA 1987). Because suffering carries with it the implication of a time frame, suffering is considered to be minimized where death is immediate, such as occurs with shooting. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology.

Mitigation measures and standard operating procedures used to maximize humaneness are listed in Chapter 3.

2.1.6 Effects on Regulated Deer Hunting.

Some people may be concerned that WS-conducted deer removal activities would affect regulated deer hunting by significantly reducing local deer populations.

2.2 ISSUES NOT CONSIDERED IN DETAIL (WITH RATIONALE)

2.2.1 Impact on Biodiversity

The impacts of the current WS program on biodiversity are not significant nationwide or statewide (USDA 1994). The goal of integrated wildlife damage management programs is to reduce damage, and some programs contain a component of reducing the local target species population. The proposed action would have no effect on biodiversity at the State, deer management zone or community (local) levels. Biodiversity on individual farms would likewise not be affected. Regarding deer, local areas may have lower deer densities after the project, but no area would be devoid of deer. No other wildlife species would be taken or otherwise affected. Habitats and ecosystems would not be negatively affected, and no secondary impacts on other species would be created. In some areas, plant species diversity may increase where local deer numbers are reduced.

2.2.2 Threshold of Loss

Some people believe that wildlife damage is a cost of doing business, and that a "threshold of loss" should be established before wildlife damage management is conducted. Some wildlife damage is expected and accepted by farmers, but in many cases, the economic losses to deer damage have exceeded the acceptable level and have created serious economic impacts on farm income and sustainability. WS has the legal direction to respond to requests for wildlife damage management assistance, and it is program policy to aid each requester with the goal of minimizing losses.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie NF, et al., the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part the court found that a forest supervisor need only show that damage from wildlife is threatened, to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as percentage of loss of a particular resource to justify the need for wildlife damage management actions.

2.2.3 Wildlife Damage Management Should be Fee Based.

WS was established by Congress as the program responsible for providing wildlife damage management to the people of the United States. Nationwide, funding for WS comes from Federal appropriations and a wide variety of other sources. These other sources include State and local (county or municipal) governments, Indian tribes, airports, agricultural commodity groups, and private corporations and individuals. In the United States, wildlife is a publically-owned resource that is managed in trust for the people by Federal and state wildlife management agencies. Wildlife damage management is an integral component of wildlife management. One common belief regarding funding for wildlife damage management is that it should be all taxpayers' shared responsibility to pay for wildlife damage to private property, since wildlife is a public resource. White-tailed deer are not afforded Federal protection, and Federal wildlife management agencies have no direct regulatory authority pertaining to deer management on private or non-Federally-owned public lands. Resident mammals, such as white-tailed deer are managed by state wildlife agencies in trust for the citizens of the state. However, Federal agencies, such as WS, may contract with states to conduct deer damage management projects. The proposed action would be funded entirely by non-Federal sources.

2.2.4 American Indian and Cultural Resource Concerns

The National Historic Preservation Act (NHPA) of 1966, and its implementing regulations (36 CFR 800), requires Federal agencies to: 1. determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2. if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3. consult with appropriate American Indian Tribes to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings. The proposed WS deer control actions do not cause ground disturbances nor do they otherwise have the potential to affect visual, audible, or atmospheric elements of historic properties and are thus not undertakings as defined by the NHPA.

2.2.5 Cost Effectiveness of Shooting Deer.

The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.23) do not require a formal, monetized cost-benefit analysis to comply with NEPA. Consideration of this issue is not essential to making a reasoned choice among the alternatives being considered. The ADC EIS, Appendix L, p. 32 (USDA 1994) stated:

> *"Cost effectiveness is not, nor should it be, the primary goal of the APHIS ADC program. Additional constraints, such as environmental protection, land management goals, and others, are considered whenever a request for assistance is*

received. These constraints increase the cost of the program while not necessarily increasing its effectiveness, yet they are a vital part of the APHIS ADC program."

An analysis of cost-effectiveness in many deer damage situations is exceedingly difficult if not impossible to perform because the value of benefits, especially quantification of future losses that are prevented due to deer control, is not readily determined.

2.2.6 Protection of Children from Environmental Health and Safety Risks (Executive Order 13045).

Children may suffer disproportionately from environmental health and safety risks for many reasons. Deer damage control actions as proposed in this EA would include only safe, legal, effective and environmentally safe methods and tools, and would be conducted in areas and under circumstances where it is highly unlikely that children would be present or adversely affected. Therefore, implementation of the proposed action would not increase environmental health or safety risks to children.

2.2.7 Executive Order 12898: Environmental Justice

Executive Order 12898, entitled, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is a priority within APHIS and WS. Executive Order 12898 requires Federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. WS personnel use only safe, legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. The proposed action would not result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations. Additionally, the donation of venison to charitable organizations would be a benefit to the economically disadvantaged, and to other persons in need.

3.0 CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

NEPA and CEQ regulations (1502.14) require that the EA contain a description of alternatives, including a No Action alternative which will serve as a baseline against which other alternative(s) are evaluated. At least one other alternative must be considered, and a "Preferred Alternative" identified. This section objectively evaluates the reasonable alternatives, and briefly describes alternatives not given detailed analysis.

Alternatives analyzed in detail are:

- Alternative 1 - No Action/ Current Program
- Alternative 2 - Proposed Action/WS Shoots Deer

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1 - No Action/Current Program.

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternative(s).

Under the No Action/Current Program Alternative, there would be no WS involvement in managing white-tailed deer in NJ (Section 1.2.3). Farmers requesting assistance with reduction of deer damage to agricultural crops would contact the Division and be provided with information on techniques, tools, and programs, as well as access to fencing and repellents, and field visits by Division personnel to issue Permits to Kill Wild Deer and Noise Maker Permits. Farmers would be given advice on optimizing use of regulated deer hunting to reduce crop damage. Farmers and County Boards of Agriculture may participate in the Community Based Deer Management Program by developing deer management plans and identifying special deer management areas with assistance from the Division. In these cases, deer could be shot using specialized equipment (suppressed rifles) by farmers and/or other participating organizations. Hunting and shooting of deer by farmers would be directed at reducing deer densities in deer management zones where the management objective is deer population reduction.

3.1.2 Alternative 2 - Proposed Action/WS Shoots Deer

The Proposed Action is for WS to shoot deer to contribute to deer population reduction objectives in eight deer management zones in NJ. In most cases, WS shooting of deer would occur as part of community based deer management plans for special deer management areas as described in NJ P.L. 2000, Chapter 46 (C.23:4-42.3-.7). Under the Proposed Action, WS biologists would supplement ongoing deer damage management programs by shooting deer pursuant to Division-issued permits granted to County Boards of Agriculture. The only difference between the No Action and Proposed Action alternatives

is that WS personnel would also shoot deer, and would do so pursuant to Division-issued permits, requests from County Boards of Agriculture, and written farmer/landowner consent. WS shooting of deer would occur in deer management zones 5, 7, 8, 10, 11, 12, 14, and 41 where regulated hunting and farmer shooting of deer had not removed an adequate number of deer to meet the zones' population objectives of reduction. If and when deer removal by WS is conducted pursuant to special deer management permit in a designated special deer management area under the Community Based Deer Management Program, appropriate procedures and authorizations, as described in the legislation, and the area's deer management plan, would be complied with. Shooting would be conducted from elevated positions. Alternative control methods would be employed, such as specialized equipment (firearms) to optimize safety, humaneness, and efficiency. The number of deer shot by WS biologists would be reported to the Division daily. This would ensure that the Division could constantly monitor take compared to the management objective for each zone. At any time, as the Division may direct, WS would cease or modify methods of shooting of deer. Additionally, the County Board of Agriculture, or the farmer/landowner may similarly direct WS shooting of deer to be discontinued or modified. Under the Proposed Action, all other deer damage management activities as described in Section 1.2.3 (The Division's Deer Damage Management Program) could continue to occur, and would typically include hunting, shooting (under permit), fencing, harassment, repellents, and other tools and methods. The only new addition to the program would be WS's participation in shooting deer. Safe operation of vehicles, firearms, and all other tools, techniques, and approaches would be the program's top priority.

Other aspects of the Proposed Action include:

1. WS biologists would be listed by name on Division-issued permits to County Boards of Agriculture.
2. Farmer/landowner consent would be obtained prior to WS shooting of deer.
3. WS biologists would shoot deer up to 6 days a week (Monday-Saturday), during the day and night, using authorized legal tools and techniques. In most cases, WS shooting of deer would occur during February-March. Additionally, more-restrictive Division/County Board of Agriculture/Township/farmer/landowner preferences regarding time, day, duration, and other specifications of the proposed action would be honored.
4. Shooting would be from elevated positions (stands, stationary vehicles, etc.) in order to maximize safety and efficiency.
5. WS shooting of deer would not occur during the regulated deer hunting seasons.

Additionally, the agricultural community or other entity would develop and conduct procedures to maximize the extent to which venison is donated to charitable organizations.

3.2 STRATEGIES AND METHODS AVAILABLE TO WS IN NEW JERSEY.

The strategies and methods described below include those that could be used under Alternative 2.

3.2.1 Integrated Wildlife Damage Management (IWDM).

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of management methods in an effective manner while minimizing the potentially harmful effects on humans, target and nontarget species, property and the environment. IWDM may incorporate cultural practices (i.e., animal husbandry), habitat modification (i.e., exclusion), animal behavior modification (i.e., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem. WS supports and implements the IWDM approach.

3.2.2 WS Decision Making.

WS personnel use a methodical thought process for evaluating and responding to damage complaints and requests for assistance that is depicted by the WS Decision Model described by Slate et al. (1992). WS personnel are frequently contacted after requesters have tried or considered nonlethal methods and found them to be impractical, too costly, or inadequate for reducing damage to an acceptable level. WS personnel assess the problem and evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management may be ended. In some cases, continual conduct of effective wildlife damage management activities is necessary to relieve damage. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the ongoing damage management strategy. The Decision Model is not necessarily a written process, but a mental problem-solving process common to most, if not all professions.

3.2.3 Deer Damage Management Methods Available to WS in NJ

Pursuant to the Division's request for assistance, shooting is the method available to WS to assist the Division in conducting its integrated deer damage management program. Other methods that are legal, safe and available for use include fencing, pyrotechnics, propane cannons, chemical repellents, hunting, modification of agricultural practices (crop type, placement, and planting/harvest dates), and shooting of deer by farmers or their agents. WS shooting of deer would be one aspect of the farm's overall integrated deer damage management program.

In agricultural areas that have been designated as special deer management areas (pursuant to NJ P.L 2000, Chapter 46), shooting could be conducted by WS biologists pursuant to

permits issued by the Division to County Boards of Agriculture. Firearms and associated ammunition and other devices would be those authorized for use under the permit, and as described in Title 23, the current Game Code, P.L. 2000, Chapter 46, and/or pertinent State laws, regulations, and policies.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Several alternatives were considered but not analyzed in detail. These were:

3.3.1 WS Provision of Technical Assistance and/or Nonlethal Operational Assistance

The Division has the legal authority, expertise, and personnel to conduct and facilitate the current integrated deer damage management program by providing technical information, free repellents and fencing materials, establishing and monitoring regulated deer hunting seasons, and administering a community-based deer management program. The Division has specifically requested that WS provide assistance by shooting deer on select NJ farms pursuant to permit and farmer/landowner consent, since WS has the expertise, training, and legal authority to assist in conducting deer damage control activities. The Division has not requested that WS conduct deer damage activities other than shooting. WS does not have the authority to require that the Division implement any specific deer damage management methods or group of methods.

3.3.2 Division Compensates Farmers for Deer Damage Losses

The Compensation alternative would require the establishment of a system to reimburse farmers for deer damage. This alternative was eliminated from further analysis because no Federal or State laws, regulations, policies, programs, or funding currently exist to authorize such action. Aside from lack of legal authority, analysis of this alternative in the FEIS (USDA 1994), and discussion in the literature (Wagner et al.1997) indicates that the concept has many drawbacks:

- It would require large expenditures of money and labor to investigate and validate all damage claims, and to determine and administer appropriate compensation. A compensation program would likely cost several times as much as the current and proposed programs.
- Compensation programs rarely pay producers for the full value of all indirect and direct costs associated with wildlife damage.
- Compensation would take incentive away from farmers to control wildlife damage through improved cultural, husbandry, or other practices and management strategies.

- Not all resource owners would rely completely on a compensation program and lethal control would most likely continue as permitted by NJ law and regulation.
- Compensation does not reduce deer damage to crops.
- Compensation would increase over time in the absence of damage management, and with increasing deer densities.

3.3.3 Deer Population Reduction Through Reproductive Control

Reproductive control is often considered for use where wildlife populations are overabundant and where traditional hunting or lethal control programs are not publicly acceptable (Muller et al. 1997). Use and effectiveness of reproductive control as a wildlife population management tool is limited by population dynamic characteristics (longevity, age at onset of reproduction, population size and biological/cultural carrying capacity, etc.), habitat and environmental factors (isolation of target population, cover types and access to target individuals, etc.), socioeconomic and other factors. Population modeling indicates that reproductive control is more efficient than lethal control only for some rodent and small bird species with high reproductive rates and low survival rates (Dolbeer 1998). Additionally, the need to treat a sufficiently large number of target animals, multiple treatments, and population dynamics of free-ranging populations place considerable logistic and economic constraints on the adoption of reproduction control technologies as a wildlife management tool for some species. Research into reproductive control technologies, however, has been ongoing, and the approach will probably be considered in an increasing variety of wildlife management situations.

Reproductive control for wildlife could be accomplished either through sterilization (permanent) or contraception (reversible, initial treatment usually followed by a booster and annual follow-up treatments). Sterilization could be accomplished through : 1. surgical sterilization (vasectomy, castration, and tubal ligation), 2. chemosterilization, and 3. gene therapy. Contraception could be accomplished through: 1. hormone implantation (synthetic steroids such as progestins), 2. immunocontraception (contraceptive vaccines), and 3. oral contraception (progestin administered daily). Research into the use of these techniques would consist of laboratory/pen experimentation to determine and develop the sterilization or contraceptive material or procedure, field trials to develop the delivery system, and field experimentation to determine the effectiveness of the technique in achieving population reduction.

The use of hormones was investigated (Matschke 1976, 1977 a, b, c, 1980, and Roughton 1979), and eventually rejected as an effective and efficient reproductive

control technique for deer. Additionally, concerns related to costs and logistics of widespread distribution of drugged baits, dosage control and ingestion of baits by children and nontarget animals make oral contraception (by steroids) largely impractical (Lowery et al. 1993). More recently, immunocontraception has been studied in various situations and locations, but its potential use appears limited due to considerable constraints regarding treatment and follow-up treatment of a sufficiently large number of target animals, varying immunogenecity of vaccines, genetic backgrounds of individual animals, age, nutritional status, stress and other factors (Becker et al. 1997, Becker et al. 1999). Immunocontraceptive vaccines prevent contraception by stimulating the production of antibodies that bioneutralize proteins or hormones essential for reproduction (Miller et al. 2000). The use of porcine zona pellucida (PZP) as a contraceptive agent in wildlife management has been investigated recently (Kirkpatrick et al. 1990, Turner and Kirkpatrick 1991, Turner et al. 1992, and Turner et al. 1996), but to date, there is no published documentation that immunocontraceptive vaccines have successfully reduced any free-ranging white-tailed deer herd or population. Additionally, Underwood and Verret (1998) reported that despite 5 years of PZP treatment, the Fire Island, NY deer population continued to grow, albeit at a slower rate. Other components of the reproductive system have been studied for immunocontraception as well, such as GnRH (Becker and Katz 1997, Becker et al. 1999).

Recently, Canadian researchers at Dalhousie University (Halifax, Nova Scotia) have investigated the use of a single-dose immunocontraceptive vaccine based on liposome delivery of PZP antigens (Spay Vac ™), and reported a 90% reduction in pup production by gray seals (*Halichoerus grypus*) (Brown et al. 1997). Fraker et al. (in press) reported that fertility of an island population of fallow deer (*Dama dama*) was greatly reduced by a single administration of Spay Vac ™ during the first year of treatment; a longer- term assessment is underway. Use of Spay Vac ™ on white-tailed deer is being investigated in CT by private researchers (enclosed herd of approximately 20 deer), and preliminary results on the effectiveness of the material in reducing fawning will be available in 2001. Refinement of the delivery system and field application/experimentation on the ability of Spay Vac ™ to reduce free-ranging deer populations would occur in subsequent years.

Turner et al. (1993) note that although contraception in white-tailed deer may be used to limit population growth, it will not reduce the number of deer in excess of the desired level in many circumstances. They further contend that initial population reductions by various other means may be necessary to achieve management goals, and that reproduction control would be one facet of an integrated program. In sum, although immunocontraceptive technology has been variously effective in laboratories, pens, and in island field applications, it has not been effective in reducing populations of free-ranging white-tailed deer.

Development of a single-shot sterilization technique as an alternative to immunocontraception may be investigated by Rutgers scientists starting in 2000. One possible approach is gene therapy which could accomplish reproductive control via sterilization by causing death of the anterior pituitary cells that synthesize luteinizing hormone (LH), which triggers ovulation in females and spermatogenesis in males. Efficacy testing and development of a delivery systems will be investigated over the next few years (L. Katz, pers. comm.).

The use of reproductive control is subject to Federal and State regulation. Additionally: 1. no chemical or biological agent to accomplish reproductive control for free-ranging deer has been approved by Federal and NJ authorities, 2. for deer, reproductive control has not been shown to reduce free-ranging populations or damage, 3. if an effective tool was legally available, and if the project area was fenced, it would take many years for the deer population to stabilize at a lower level, and crop damage would continue to occur at unacceptably high levels, and 4. there are considerable logistic, economic and sociocultural limitations to the trap, capture and chemical treatment of the hundreds or thousands of deer that would be necessary to effect an eventual decline in the population. Because there is no tool currently available for field application, and due to considerable logistic, economic, and sociocultural limitations to the use of fertility control on free-ranging white-tailed deer, this approach is not considered for further analysis in this EA.

3.3.4 Trap and Relocate Deer

This alternative would involve capturing deer alive using cage-type traps followed by relocation of the captured deer to another deer management zone. Trapping and relocating deer is expensive ($273-$2,876/deer) (O'Bryan and McCullough 1985, Bryant and Ishmael 1991), time-consuming and inefficient (Ishmael and Rongstad 1984, O'Bryan and McCullough 1985, Diehl 1988, Jones and Witham 1990, Ishmael et al. 1995, and Cromwell et al. 1999). Physiological trauma and deer mortality during capture and transportation would be high and deer mortality after relocation has ranged from 25-89% (Jones and Witham 1990, Mayer et al. 1993). Capture myopathy, a stress-related disease that results in delayed mortality of captured deer is an important factor (Cromwell et al., 1999), and may be as high as 26% (Rongstad and McCabe 1984). Although relocated deer usually do not return to their location of capture, some do settle in similar habitats and create similar problems as occurred in the original site. The American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists oppose relocation of mammals because of the risk of disease transmission (USDA 1994). High mortality rates of relocated deer, combined with the manner in which many of these animals die, make it difficult to justify relocation as a humane alternative to removal methods (O'Bryan and McCullough 1985, Jones and Witham 1990, Bryant and Ishmael 1991, Ishmael et al.

1995, and Cromwell et al. 1999).

3.4 MITIGATION AND STANDARD OPERATING PROCEDURES

3.4.1 Mitigation in Standard Operating Procedures (SOPs)

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide and in NJ, uses many such mitigation measures and these are discussed in detail in Chapter 5 of the FEIS (USDA 1994).

Some key mitigating measures pertinent to the proposed action and alternatives that are incorporated into WS's Standard Operating Procedures are listed below. Any decision that results from this EA that includes WS actions would also include mitigation measures contained in this section.

- The WS Decision Model is used to identify effective wildlife damage management strategies and their impacts.
- Reasonable and prudent measures or alternatives are implemented to avoid impacts to T&E species.
- Research is being conducted to improve wildlife damage management methods and strategies so as to increase selectivity for target species, to develop effective nonlethal control methods, and to evaluate nontarget hazards and environmental impacts.

Some additional mitigating factors specific to the current program include:

- Management actions would be directed toward the zones' deer population. Generalized population suppression across the State would not be conducted.

- WS uses methods and tools for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a risk assessment conducted in the programmatic EIS (USDA 1994), Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazard to the public is even further reduced.

3.4.2 Additional Mitigation Specific to the Issues

The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

3.4.2.1 Effects on Target Species Populations

WS activities would be directed at reducing the local deer population through shooting in deer management zones and special deer management areas with the objective of population reduction. Activities would not be directed at eradicating deer populations in the entire area, zone or State. WS take of deer would be recorded by WS and monitored (daily) by the Division, to maintain it within the levels determined by the Division to achieve desired deer population reduction objectives.

3.4.2.2 Effects on Nontarget Species Populations Including T&E Species

WS personnel are trained and experienced to select the most appropriate tools and methods for taking target animals and excluding nontargets.

Nationally, WS has consulted with the FWS regarding potential impacts of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1994). Further consultation on species not covered by or included in that formal consultation process has been initiated with the USFWS and WS will abide by any RPAs, RPMs, and terms and conditions that result from that process to avoid jeopardizing any listed species.

In NJ, WS has conferred with the Division's Endangered and Nongame Species Program, which has determined that the proposed WS action would have no effect on State T&E species or their habitats and ecosystems. The FWS Ecological Services office provided a list of Federal T&E species in NJ counties and townships; WS has determined that the proposed WS actions will have no affect on Federal T&E species. WS will contact FWS if the proposed action changes in the future.

3.4.2.3 Effects on Human Health and Safety

Trained and professional wildlife biologists employed by the WS program would conduct deer shooting activities according to all safety guidelines and through use of safe and legal firearms and equipment.

Target animals would be positively identified before shots are taken. Shooting would be done in safe zones and in such a manner as to not scare deer across roadways.

3.4.2.4 Effects on Aesthetics

WS shooting and handling of deer would be done professionally and discretely so as to minimize the impact of the public's aesthetic appreciation for deer.

Overall, deer would continue to be available for viewing and appreciation, although in some zones, deer densities would be lower. Deer would not be eradicated from any zone.

3.4.2.5 Humaneness of Shooting Deer

WS biologists attempt to kill target animals as quickly and humanely as possible.

Research continues within the WS program with the goal of improving the selectivity and humaneness of tools and methods.

All management methods would be used in a manner that minimizes pain and suffering of individual animals, to the extent that the method is effective and its use is practical.

3.4.2.6 Effects on Regulated Deer Hunting

WS would not shoot deer during NJ deer hunting seasons.

WS deer shooting would only occur in deer management zones where the deer management goal to reduce the population was not met through hunting and through shooting of deer by farmers.

WS deer shooting would occur on farms were regulated deer hunting had occurred, but was not sufficient to reduce the deer population to within the levels prescribed by the Division.

The number of deer expected to be shot by WS would be a very small portion of the deer taken during regulated deer hunting in NJ.

4.0 CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative. The Chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of the alternatives to determine if the potential impacts would be greater, lesser, or the same. Therefore, the No Action alternative serves as the baseline for analysis and comparison.

The following resources are not expected to be significantly impacted by either of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further. Additionally, other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources. The Proposed Action would not constitute undertakings that could adversely affect historic resources under the National Historic Preservation Act.

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

Table 2 summarizes impacts of the alternatives for each issue considered in detail.

4.1.1 Effects on Target Deer Populations

Within deer management zones 5, 7, 8, 10, 11, 12, 14, and 41, deer population management objectives established by the Division are deer population reductions.

4.1.1.1 Alternative 1 - No Action

The No Action Alternative consists of an integrated deer damage management program with no WS involvement. This alternative would have a slight positive effect on the Division's objective of deer population reduction. Shooting of deer by hunters and farmers is directed at deer population reduction. In most of the eight project area zones, the objective of deer density reduction has not been achieved in the past, although in some cases, local deer numbers have been reduced somewhat. Deer would not be eliminated from the State, zone, or local area and deer would continue to be present although in lower densities. Under the No Action Alternative, farmer and hunter shooting of deer may have a slight positive effect on the Division's population objective. However, to date, this approach has not resulted in objectives being met in the proposed project area.

Horton and Craven (1997) reported that in WI, assessed deer damage to agricultural crops decreased an average of 31.4% in the first year of farmer use of deer shooting permits, then decreased to a lesser extent in subsequent

years.

4.1.1.2 Alternative 2 - Proposed Action

The Proposed Action consists of WS involvement in shooting deer in designated special deer management areas. This alternative would have a positive effect on the Division's objective of deer population reduction in the eight zones of the proposed project area. The farmers' and Division's objective is to fully implement deer management methods to achieve a reduction in the target deer population, both at the local (farm) level and the deer management zone and special management area levels. WS shooting of deer would be in addition to deer removal achieved through regulated deer hunting and shooting of deer by farmers pursuant to permit, and would occur on farms within special deer management areas where the combination of other methods has failed to sufficiently reduce the deer population. This most likely would reduce the local (farm) deer population, and may have an impact on the zones'/area's deer population. This potential consequence is the program's objective, and is considered a positive impact of the proposed action. Deer would not be eliminated from the State, zone, or area and deer would continue to be present although in lower densities. Compared to the No Action alternative, the Proposed Action is expected to have a larger positive impact on the reduction of area and zone deer densities, due to the additive impact of deer shot by WS.

White-tailed deer do not exhibit self-regulatory mechanisms whereby compensatory reproduction (increased production of fawns) occurs following population reductions (accomplished through shooting, hunting, or other mechanisms) when the free-ranging population is well below biological carrying capacity (Keith 1974, Wagner et al. 1995). New Jersey deer populations are below biological carrying capacity throughout most of the state (NJDFW 1998). Removal of deer by WS would not likely result in compensatory reproduction in remaining does. Alternately, compensatory reproduction may have occurred elsewhere/in the past where fenced deer populations occurred at or above biological carrying capacity, and where population control measures were taken. This did occur at the Earl Naval Ammunition Depot (Monmouth Co., NJ) in the early 1970's; importantly, although reproductive rate did increase following deer removals, the overall population size was greatly reduced (R. Lund pers. comm.). In sum, compensatory reproduction is not expected to follow the proposed removal of deer by WS, since the deer population is well below biological carrying capacity, and the deer population is not currently limited by competition for food, space, water, and/or breeding opportunities.

4.1.2 Effects on Nontarget Species Populations, including Threatened and Endangered Species.

4.1.2.1 Alternative 1 - No Action

Under the No Action Alternative, the Division's current deer management program to reduce crop damage would continue, with the take of nontarget species expected to be nonexistent. Other wildlife populations would not be negatively affected, except for the occasional scaring effect from the sound of gunshots. In these cases, birds and other mammals may temporarily leave the immediate vicinity of shooting, but would most likely return after conclusion of the action. The Division's Endangered and Nongame Species Program has determined that shooting deer to reduce deer density in the eight deer management zones of the proposed project area would not adversely affect any state-listed T&E species or their habitats and ecosystems (Appendix D). The FWS has provided WS with a list of Federal T&E species in NJ by county and township (Appendix E). WS has determined that the No Action alternative (current program) would have no affect on any Federal T&E species.

4.1.2.2 Alternative 2 - Proposed Action

Under the Proposed Action, the take of nontarget species by WS is expected to be minimal or nonexistent. The consequences of the proposed action on nontarget species are the same as those identified for the No Action Alternative (above).

Regarding T&E species, the Division's Endangered and Nongame Species Program has stated that, "The reduction of white-tailed deer density in the study area would not adversely impact any of the (state) listed species nor would it be detrimental to the habitats or ecosystems on which these species depend. Also, the proposed method of deer control, which is shooting, is not anticipated to have any direct or indirect impact on any of the listed species" (Appendix D). The FWS has provided WS with a list of Federal T&E species in NJ by county and township (Appendix E). WS has determined that the proposed action would have no affect on any Federal T&E species. In sum, participation of WS in the Division's Deer Management Program would not increase the already minimal/nonexistent impacts of the program on nontarget species, and would have no effect on State or Federal T&E species.

4.1.3 Effects on Human Health and Safety

4.1.3.1 Alternative 1 - No Action

The effects on human health and safety of farmer use/application of fencing, repellents, harassment, and modification of farming practices would be minimal, as long as repellents are applied according to label instructions, fencing is installed properly and is maintained and repaired, and harassment tools (pyrotechnics and propane cannons) are used according to standard safety guidelines. The public is more concerned about potential effects of the use of firearms on human health and safety, through accidentally shooting a person or through increased traffic hazards of deer that may be frightened into roadways. There have been no instances of NJ farmers accidentally shooting a person during conduct of deer control activities. The extent to which deer shooting activities conducted by farmers affect traffic safety is difficult to determine, but overall, shooting deer is expected to have a net positive impact on traffic safety by reducing the deer density in zones where shooting occurs. There is minimal risk of human injury from hunter/farmer use of firearms to shoot deer.

4.1.3.2 Alternative 2 - Proposed Action

The consequences of the proposed action on human health and safety are very similar to those identified for the No Action Alternative (above). The addition of WS biologists shooting deer as a supplement to the deer damage management program would not increase the program's effects on human health and safety. In some cases, WS involvement may reduce the already minimal potential effects on safety, since WS biologists are experienced and specifically trained to handle and discharge firearms in a safe and responsible manner. Shooting from elevated positions (stands, stationary vehicle, etc.) increases safety by resulting in a downward trajectory of the projectile. WS works in compliance with Federal and State laws, regulations, and policies regarding conduct of wildlife damage work, use and transport of firearms, etc. WS biologists would follow mitigation and SOP's to reduce or eliminate any potential negative impacts. WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a crime of domestic violence. A moderate positive effect from reduction in deer-vehicle collisions is expected. There is no probable risk of human health or safety effects from methods used by WS.

4.1.4 Effects on Aesthetics

4.1.4.1 Alternative 1 - No Action

Since the No Action alternative would not cause deer to be extirpated from the local area, the deer management zone, or the special deer management area, most people's aesthetic appreciation of deer would not be affected. Deer would continue to occur, although possibly at lower densities, and people would continue to gain enjoyment from viewing deer and from the knowledge of their existence nearby. People who may have formed affectionate bonds with individual deer would be affected (emotional impact) if these individual deer are shot by farmers or hunters. However, this impact may be reduced by the continued existence of other deer in the area. Deer control activities conducted by farmers and deer hunters are typically conducted away from public view, at safe distances from roadways and homes or other buildings. This improves safety, and also accommodates aesthetic values of members of the public who do not want to observe shot deer.

4.1.4.2 Alternative 2 - Proposed Action

Consequences of the Proposed Action on aesthetics would be similar to those described for the No Action alternative (above) except more deer would probably be killed under this alternative. Additionally, WS shooting of deer would be conducted primarily from dusk-dawn, to best accomplish program objectives. A secondary benefit of this would be a minimization of aesthetic impacts on members of the public who do not want to observe shot deer. WS shooting of deer could negatively effect individuals that have formed affectionate bonds with individual deer, if these deer were shot. The degree to which this would occur in the relatively rural farming communities of the proposed project area is expected to be minimal.

4.1.5 Humaneness of Shooting Deer

4.1.5.1 Alternative 1 - No Action

Under the No Action alternative, deer would be shot by hunters and farmers. Shooting is considered by most people to be a humane method of killing deer if it results in immediate death. Hunters and farmers have varying values and beliefs about the need to maximize humaneness, although the majority would attempt to achieve quick kill of deer. Some people may consider any lethal method to be inhumane.

4.1.5.2 Alternative 2 - Proposed Action

Under the Proposed Action, deer would also be shot by WS biologists. Impacts regarding humaneness of shooting deer under this alternative are similar to those described for the No Action Alternative. WS biologists are

specifically trained and accountable for humane treatment of wildlife.

4.1.6 Effects on Regulated Deer Hunting

4.1.6.1 Alternative 1 - No Action

In NJ, deer hunting typically occurs during October-January, within 6 seasons established by the Division. Under the No Action alternative, deer hunting would occur on farms in the proposed project area, and is considered to be one of the most important aspects of integrated deer damage management programs. The Division encourages farmers to maximize the extent to which hunting is employed. Individual landowners who rent land to farmers may restrict hunting because of personal opposition to hunting, the desire to provide hunting privileges to a select few people, or safety and liability concerns. Shooting of deer by farmers pursuant to permit would be another aspect of the integrated program on farms, and would be used in combination with other methods, including hunting. Farmers would manage hunting and shooting of deer to best contribute to a reduction in deer damage to crops. The no action/current program has a positive effect on regulated deer hunting.

4.1.6.2 Alternative 2 - Proposed Action

Shooting of deer by WS biologists under the Proposed Action would only occur on farms in deer management zones where the Division's deer management objective to reduce deer densities was not met by hunting and shooting of deer by farmers. The effect of the Proposed Action on regulated deer hunting is similar to that described for the No Action alternative. The participation of WS in the deer damage management program would result in additional deer being shot. This activity would result in reduced deer densities on project area farms and may reduce densities in some deer management zones and special deer management areas, hence slightly reducing the number of deer that may otherwise be available to hunters during subsequent hunting seasons. However, local and zone deer density reductions are the management objectives of the Division in the proposed project area. The impact of this, however, is expected to be minimized due to several features of the proposed program:

- WS deer shooting would not occur during regulated deer hunting seasons.
- The number of deer expected to be shot by WS is minimal compared to the number taken by hunters.
- The number of deer expected to be taken by WS would not cause a statewide deer population reduction.

There may be some cases, where landowners have not permitted regulated

deer hunting, but would allow WS biologists to shoot deer. This would have only a minimal impact on deer hunting, since the land was not previously accessible to hunters.

4.2 CUMULATIVE IMPACTS

No significant cumulative environmental impacts are expected for either of the two alternatives. Under the Proposed Action, shooting of deer by WS would contribute towards the Division's deer management objective of population reduction in the specified zone(s) (Table 2) and within special deer management areas. Deer would continue to occur in all parts of NJ, although at lower densities in certain management zones and areas. The Division is the agency with statutory authority to manage deer in NJ, and is responsible for establishing goals and objectives regarding deer densities (Section 1.7.1.2). In zones and areas where shooting of deer by hunters and farmers has achieved the Division's harvest objective, WS would not shoot deer. In zones and areas where shooting of deer by hunters and farmers has not achieved the Division's harvest objective, WS would shoot deer, pursuant to the request from the County Board of Agriculture, and according to farmers/ landowner consent. The number of deer taken by WS biologists would be a very small percentage of those taken by hunters and farmers in the zone. The Division would closely monitor WS take of deer to ensure that population reduction objectives (total deer to be taken through all approaches: hunting, farmer permits, and WS activities) are not exceeded. No risk to public safety is expected, since only trained and experienced WS wildlife biologists would conduct shooting, and precautionary procedures have been established to virtually eliminate the chance of a stray projectile from endangering members of the public. The analysis in this EA indicates that WS shooting of deer will not result in significant cumulative adverse impacts on the quality of the human environment.

5.0 CHAPTER 5 - LIST OF PREPARERS AND PERSONS CONSULTED

5.1 LIST OF PREPARERS AND REVIEWERS

Janet L. Bucknall, State Director (NJ/PA), USDA APHIS Wildlife Services, Pittstown, NJ

David Reinhold, Environmental Coordinator, USDA APHIS Wildlife Services, Raleigh, NC

5.2 LIST OF PERSONS CONSULTED

Lisa Arroyo, Endangered Species Biologist, U.S. Fish and Wildlife Service, Pleasantville, NJ
Robert Eriksen, Supervising Biologist, New Jersey Division of Fish and Wildlife (Wildlife Control Unit), Clinton, NJ
Brad Holloway, Principal Wildlife Biologist, New Jersey Division of Fish and Wildlife (Community Based Deer Management Project), Clinton, NJ
Robert Lund, Research Scientist I, New Jersey Division of Fish and Wildlife (Deer Management Project), Clinton, NJ
Peter Poulos, Wildlife Biologist, USDA APHIS WS, Riverdale, MD
James Sciascia, Principle Zoologist, New Jersey Division of Fish and Wildlife, Endangered and Nongame Species Program, Trenton, NJ.

5.3 PUBLIC INVOLVEMENT

The Pre-Decisional EA was available for public review and comment during a 30-day period (February 28 - March 29, 2000), which complies with or exceeds public involvement guidelines/policies contained in NEPA, CEQ regulations, and APHIS WS's Implementing Regulations, as well as all pertinent agency laws, regulations, and policies. A Legal Notice of Availability was placed in The Star Ledger, a daily newspaper with geographic coverage of all of the proposed project area, for three days (February 28 - March 1).

The Pre-Decisional EA was mailed directly (February 28) to agencies, organizations, and individuals with probable interest in the proposed program: Humane Society of the United States, Hunterdon County Board of Agriculture, New Jersey Department of Agriculture, New Jersey Farm Bureau, New Jersey State Board of Agriculture, New Jersey State Federation of Sportsmens Clubs, Rutgers University, The Fund For Animals, and five (5) private individuals. An additional one (1) organization (United Bowhunters of New Jersey) and 2 individuals requested and were provided with the document.

A total of 28 comment documents were received via mail and e-mail from 23 individuals, 1 university, 2 organizations, and 1 State agency. In one (1) of these cases, the commentor stated that she had not obtained or read the pre-decisional EA, but was submitting comments based on her beliefs regarding the document. Issues contained in the comment letters were analyzed and evaluated, and clarifications and modifications were made in the text. Eight (8) letters supported the proposed action, and agreed that it is acceptable and appropriate for the WS program to participate in deer damage management in NJ by assisting the Division in achieving deer

population management goals in the 8 zones of the proposed project area. Twenty (20) letters opposed the proposed action, and contained one or more of the issues identified below. The manner in which each issue was responded to is identified in Appendix F. All issues were fully considered, and appropriate text was modified or expanded upon (Appendix F identifies the manner in which issues were considered in the development of this document).

Table 1. Deer population information for eight deer management zones of the proposed project area in west-central New Jersey. Information provided by the NJ Division of Fish and Wildlife.

Zone	Counties	Deer Range (mi^2)	Pre-hunting Season Population (1998)*		2000 Population Objective	Actual Deer Harvest (1999-2000)
			Number	Density (deer/mi^2)		
5	Warren, Sussex	239	13,524	57	Reduce	7,130
7	Hunterdon, Warren	110	6,895	63	Reduce	3,429
8	Hunterdon, Warren, Morris, Somerset	225	14,662	66	Reduce	7,430
10	Hunterdon, Warren	120	9,146	76	Reduce	4,677
11	Hunterdon	75	5,630	75	Reduce	3,070
12	Hunterdon, Mercer, Somerset	175	11,177	64	Reduce	5,527
14	Mercer, Middlesex, Somerset	190	5,686	30	Reduce	3,225
41	Hunterdon, Morris	42	2,745	65	Reduce	1,553
Total		1172	69,465	59		36,041

* Autumn 1998 deer density data is the most current information available.

Table 2. Comparison of consequences/impacts for various issues under the No Action/Current Program and Proposed Action alternatives.

Issue	No Action/Current Program	Proposed Action (WS Shoots Deer)
Effects on Target Deer Populations	Slight positive effect on the Division's objective of deer population reduction. Hunting and shooting of deer by farmers in most management zones has not achieved Division-established deer population reductions.	Positive effect on the Division's goal of deer population reduction. Shooting of deer by WS biologists combines with farmer/hunter deer removal to achieve or get closer to Division-established deer population reductions.
Effects on Nontarget Species Populations, Including T&E	No effect	No effect
Effects on Human Health and Safety	Slight positive effect from reduced deer-vehicle collisions. Minimal risk of human injury from hunter/farmer use of firearms.	Moderate positive effect from further reduced deer-vehicle collisions near farms with take of deer that achieves Division-established population density reductions. No probable risk of human health or safety effects from methods and techniques employed by WS.
Effects on Aesthetics	Deer continue to occur in all zones. Effect of shooting deer by hunters and farmers on aesthetics varies. Some people may have affectionate bonds with individual deer, and they may be negatively effected if the deer is shot by farmers/hunters.	Deer continue to occur in all zones, at slightly lower levels. Some people may have affectionate bonds with individual deer, and they may be negatively effected if the deer is shot by WS biologists. Deer will be shot and handled professionally and discretely, to minimize impacts on aesthetics.
Effects on Regulated Deer Hunting	Positive effect. Hunting is an important aspect of deer management to reduce crop losses in all zones with deer population reduction as the management strategy.	Positive effect. WS shooting of deer would occur after conclusion of hunting seasons. Hunting continues as part of the farms' integrated programs.
Humaneness and Animal Welfare Concerns	Shooting of deer by hunters and farmers considered humane by most, others may consider any method of killing deer to be inhumane.	Shooting of deer by WS biologists considered humane by most, but others may consider any method of killing deer to be inhumane. WS biologists specifically trained and accountable for humane treatment of wildlife.

APPENDIX A

LITERATURE CITED

AVMA (American Veterinary Medical Association). 1987. Journal of the American Veterinary Medical Association. Panel Report on the Colloquim on Recognition and Alleviation of Animal Pain and Distress. 191:1186-1189.

Becker, S.E. and L.S. Katz. 1997. Gonadotropin-releasing hormone (GnRH) analogs or active immunization against GnRH to control fertility in wildlife. Pp. 11-19 *in* Contraception in Wildlife Management. Tech. Bull. 1853. USDA APHIS Washington, DC.

Becker, S.E., W.J. Enright, and L.S. Katz. 1999. Active immunization against gonadotropin-releasing hormone in female white-tailed deer. Zoo Biology 16:385-396.

Berryman, J.H. 1991. Animal damage management: responsibilities of various agencies and the need for coordination and support. Proc. East. Wildl. Damage Control Conf. 7:152-164.

Brown, R.G., W.D. Bowen, J.D. Eddington, W.C. Kimmins, M. Mezei, J.L. Parsons, and B.Pohajdak. 1997. Evidence for long-lasting single administration contraceptive vaccine in wild grey seals. J. Repro. Immun. 35(1997): 43-51.

Bryant, B.K. and W. Ishmael. 1991. Movement and mortality patterns of resident and translocated suburban white-tailed deer. Pages 53-58 in L.W. Adams and D.L. Leedy, eds. Wildlife conservation in metropolitan environments. Natl. Inst. Urban Wildl. Symp. Ser. 2, Columbia, MD.

Burnett, A.W., S. Predl, and D.M. Ferrigno. 1999. Annual deer harvest. New Jersey Department of Environmental Protection, Division of Fish, game and Wildlife, Trenton, NJ. Federal Aid in Wildlife Restoration. Project W-68-R-1.

Burke, D., A. Deatly, R.E. Erickson, R.C. Lund, P.A. McConnell, and R.P. Winkel. 1990. An assessment of deer hunting in New Jersey. New Jersey Department of Environmental Protection, Division of Fish, Game and Wildlife. Federal Aid to Wildlife Restoration Project W45R-26.

Burke, D. and A.W. Burnette. 1998. New Jersey's deer management program briefing paper. Department of Environmental Protection, New Jersey Div. Fish and Wildlife, Trenton, NJ. 7 pp.

Burke, A.W., S. Predl, and D.M. Ferrigno. 1999. Annual deer harvest, New Jersey Department of Environmental Protection, Division of Fish, Game and Wildlife, Trenton, NJ. Federal Aid in Wildlife Restoration. Project W-68-R-1.

Civil No. 92-C-0052A. January 1993. United States District Court of Utah, Civil No. 92-C-0052A, 1993.

Cromwell, J.A., R.J. Warren, and D.W. Henderson. 1999. Live-capture and small-scale relocation of urban deer on Hilton Head Island, South Carolina. Wildl. Soc. Bull. 27(4):1025-1031.

Day, G. I., S. D. Schemnitz, and R. D. Taber. 1980. Capturing and marking wild animals. pp. 61-88 *in* Wildlife management techniques manual. S. D. Schemnitz ed. The Wildlife Society, Inc. Bethesda, MD. 686 pp.

Decker, D.J. and K.G. Purdy. 1988. Toward a concept of wildlife acceptance capacity in wildlife management. Wildl. Soc. Bull. 16:53-57.

Diehl, S.R. 1988. The translocation of urban white-tailed deer. Pages 238-249 *in* L. Nielsen and R.D. Brown, editors. Translocation of wild animals. Wisconsin Humane Society, Inc., Milwaukee, and Caesar Kleberg Wildlife Research Institute, Kingsville, TX.

Dolbeer, R.A. 1998. Population dynamics: the foundation of wildlife damage management for the 21st century. Pp. 2-11 *in* Proc. 18th Vertebr. Pest Conf., Davis, CA.

Ellingwood, M. R. 1991. A guide to implementing a controlled deer hunt. State of CT, Wildlife Div. Publication No. DR-16.

Ellingwood, M.R. and S.L. Caturano. 1988. An evaluation of deer management options. CT Dept. Envtl. Prot. DR-11. 12 pp.

Ellingwood, M.R. and J.V. Spignesi. 1986. Management of an urban deer herd and the concept of cultural carrying capacity. Trans. Of the Northeast Deer Tech. Comm. 22:42-45.

Fraker, M.A., R.G. Brown, V.C. Hawkes, G.E. Gaunt, J.A. Kerr, and B. Pohajdak. In press. Immunocontraception of an island population of fallow deer (*Dama dama*) in British Columbia. J. Wildl. Manage.

Horton, R.R. and S.R. Craven. 1997. Perceptions of shooting-permit use for deer damage abatement in Wisconsin. Wildl. Soc. Bull. 25(2):330-336.

Howard, G.P. 1972. At the crossroads. NJ Outdoors. 23(3):3-9.

Ishmael, W.E., D.E. Katsma, T.A. Isaac, and B.K. Bryant. 1995. Live-capture and translocation of suburban white-tailed deer in River Hills, Wisconsin. Pages 87-96 *in* J.B. McAninch, editor. Urban deer: A manageable resource? Proceedings 1993 Symposium, North Central Section, The Wildlife Society, 12-14 December 1993, St. Louis, Missouri.

Ishmael, W.E. and O.J. Rongstad. 1984. Economics of an urban deer-removal program. Wildl. Soc. Bull. 12:394-398.

Jones, J.M. and J.H. Witham. 1990. Post-translocation survival and movements of metropolitan

white-tailed deer. Wildl. Soc. Bull. 18:434-441.

Keith, L.B. 1974. Some features of population dynamics in mammals. Trans. International Congress of Game Biologists, Stockholm. 11:17-58.

Kellert, S.R. 1993. Public view of deer management. Pages 8-11 *in* R.L. Donald, ed. Deer management in an urbanizing region: problems and alternatives to traditional management. Proc. 1988 Conference, The Humane Society of the U.S., Washington, DC.

Kirkpatrick, J.F., I.K.M. Liu, and J.W. Turner. 1990. Remotely-delivered immunocontraception in feral horses. Wildl. Soc. Bull. 18:326-330.

Leopold, A.S. 1933. Game Management. Charles Schribner and Sons, NY, NY. 481 pp.

Lowery, M.D., J.W. Glidden, and D.E. Riehlman. 1993. Options for the management of locally overabundant and nuisance deer populations: a technical review. New York State Department of Environmental Conservation, Division of Fish and Wildlife. 26 pp.

Lund, R.C. 1997. A cooperative, community-based approach for the management of suburban deer populations. Wildl. Soc. Bull. 25(2):488-490.

Mangold, R.E. 1967. Bucks and does - an evaluation of the effects of recent controlled harvests of anterless deer. NJ Outdoors. Pp. 1-11.

Matschke, G.H. 1976. Oral acceptance and antifertility effects of microencapsulated diethylstilbestrol on white-tailed does. Proceedings of the Southeast Assoc. Of Game and Fish Comm. 29:646-651.

_____. 1977a. Antifertility action of two synthetic progestins in female white-tailed deer. J. Wildl. Manage. 41:194-196.

_____. 1977b. Fertility control in white-tailed deer by steroid implants. J. Wildl. Manage. 41:731-735.

_____. 1977c. Microencapsulated diethystilbestrol as an oral contraceptive in white-tailed deer. J. Wildl. Manage. 41:87-91.

Mayer, K.E., J.E. di Donato, and D.R. McCullough. 1993. California urban deer management: two case studies. Urban Deer Symposium. St. Louis, MO.

Miller, L. A. B.E. Johns, and G.J. Killian. 2000. Long-term effects of PZP immunization on reproduction of white-tailed deer. Vaccine (2000):568-574.

Muller, L.I., R.J. Warren, and D.L. Evans. 1997. Theory and Practice of immunocontraception

in wild animals. Wildl. Soc. Bull. 25(2):504-514.

New Jersey Division of Fish, Game and Wildlife. 1998. New Jersey's deer management program. Briefing Paper. Dept. Envtl. Prot., Trenton, NJ, 7 pp.

New Jersey Division of Fish, Game and Wildlife. 1999. The Governor's report on deer management in New Jersey. Department of Environmental Protection, Trenton, NJ. 33 pp.

O'Bryan, M.K., and D.R. McCullough. 1985. Survival of black-tailed deer following relocation in California. J.Wildl. Manage. 49:115-119.

Rongstad, O.J. and R.A. McCabe. 1984. Capture techniques. Pages 655-676 *in* L.K. Halls, ed. White-tailed deer: Ecology and management. Stackpole, Harrisburg, PA.

Roughton, R.D. 1979. Effects of oral melengestrol acetate on reproduction in captive white-tailed deer. J. Wildl. Manage. 43:428-436.

Rutgers. 1998. How are white-tailed deer affecting agriculture in New Jersey. Center for Wildlife Damage Control. 5 pp.

Schmidt, R. 1989. Wildlife management and animal welfare. Trans. N.Amer. Wildl. And Nat. Res. Conf. 54:468-475.

Schwartz, J.A., R.J. Warren, D.W. Henderson, D.A. Osborn, and D.J. Kesler. 1997. Captive and field tests of a method for immobilization and euthanasia of urban deer. Wildl. Soc. Bull. 25(2):532-541.

Slate, D.A., R. Owens, G. Connolly, and G. Simmons. 1992. Decision making for wildlife damage management. Trans. No. Amer. Wildl. Nat. Res. Conf 57:51-62.

Turner, J.W. and J.F. Kirkpatrick. 1991. New developments in feral horse contraception and their potential application to wildlife. Wildl. Soc. Bull. 19:350-359.

___, I.K.M. Liu, and J.F. Kirkpatrick. 1992. Remotely-delivered immunocontraception in captive white-tailed deer. J. Wildl. Manage. 56:154-157.

_____, J.F. Kirkpatrick, and I.K.M. Liu. 1993. Immunocontraception in white-tailed deer. Pages 147-159 *in* T.J. Kreeger, Technical Coordinator. Contraception in Wildlife Management. USDA APHIS Technical Bulletin No. 1853.

_____, J.F. Kirkpatrick, and I.K.M. Liu. 1996. Effectiveness, reversibility, and serum antibody titers associated with immunocontraception in captive white-tailed deer. J. Wildl. Manage. 60:873-880.

Underwood, H.B. and F.D. Verret. 1998. From fertility control to population control: improving efficacy of deer immunocontraceptive programs. A Workshop on the Status and Future of Wildlife Fertility Control. TWS Annual Meeting, Buffalo, NY, pp. 41-52.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control Program. 1994. Final Environmental Impact Statement. USDA, APHIS, ADC Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737.

Wagner, F. H., R. Foresta, R.B. Gill, D.R. McCullough, M.R. Pelton, W.F. Porter, and H. Salwasser. 1995. Wildlife policies in the U.S. national parks. Island Press. 242 pp.

Wagner, K.K., R.H. Schmidt, and M.R. Conover. 1997. Compensation programs for wildlife damage in North America. Wildl. Soc. Bull. 25(2):312-319.

Wildlife Society, The. 1990. Conservation policies of The Wildlife Society. The Wildlife Society, Washington DC 20 pp.

APPENDIX B
Letter Request From Division

APPENDIX C
Map of NJ Deer Management Zones

APPENDIX D
Correspondence With Division Regarding T&E Species

APPENDIX E
List of Federal T&E Species

APPENDIX F
Issues From Comment Period

APPENDIX F

ISSUE 1: Effectiveness of Shooting Deer and Compensatory Reproduction.

Seven (7) comment documents contained this issue.
Section 4.1.1.2 was modified to include discussion of factors influencing the extent to which deer exhibit compensatory reproduction.

ISSUE 2: The Division's Past and Current Program Goals.

Three (3) comment documents contained this issue.
Section 1.2.1.1 (Program Goals) and Section 1.2.1.3 (Regulated Deer Hunting) were modified and elaborated to more fully-describe the history of the Division's involvement in deer management and to place current population management goals and programs (including regulated deer hunting) in historical perspective.

ISSUE 3: Nonconsumptive Values of Deer

Three (3) comment documents contained this issue.
Section 1.2.1.1 (Program Goals) was modified to include discussion of the Division's authority, responsibility, and goals to manage deer according to a range of consumptive and nonconsumptive uses and values. Section 1.2.1.3 (Regulated Deer Hunting) was modified to more fully describe the Division's use of hunting as a deer management tool, and to describe the deer management zone approach.

ISSUE 4: Control of Deer Reproduction and Other Nonlethal Methods as Population Management Tools.

Sixteen (16) comment documents contained this issue.
Humaneness of shooting deer is more fully discussed in Section 2.1.5, Section 3.4.2.5, and Section 4.1.5.
The discussion of deer population reduction through reproductive control (Section 3.3.3) was modified to provide a more thorough discussion of this approach. Canadian scientists researching the Spay-Vac™ single dose immunocontraceptive vaccine were contacted, as was the US scientist conducting a field study with this product. The absence of legal methods and materials, and the lack of research data to support application of reproductive control as an effective population reduction approach is fully described in Section 3.3.3.
Regarding the trapping and relocation of deer, Section 3.3.4 was modified to more fully describe the expense, inefficiency, mortality rates, and other factors associated with this approach.

ISSUE 5: Human Safety and Private Property Rights.

Seven (7) comment documents contained this issue.
Section 3.1.2, Section 3.4.1, Section 3.4.2.3, and Section 4.1.3 were modified to address more completely the issue of human safety associated

with WS using firearms to shoot deer, and to state that safety (for program participants and the public) is the proposed program's top priority. Private property rights would be protected through adherence to the following procedures: 1. Written landowner and/or farmer permission to conduct the proposed activities would be obtained and retained in WS files, and 2. Landowner and farmer preferences regarding time, day, location, and features of shooting activities would be honored (Section 1.3.2).

ISSUE 6: Quantification of Deer Damage, Deer Population Size, and Effectiveness of the Proposed Program.

Three (3) comment documents contained this issue.

The most current and accurate information available from the Division was used to describe: 1. The public's use of Division programs (Section 1.2.1.4), 2. The number of deer permits issued (and number of deer taken) (Section 1.2.1.4), 3. Deer damage to NJ agriculture (Section 1.2.2), and 4. Size and distribution of the NJ deer population (Section 1.2.1.2). The Proposed Action as described in Section 1.3.2 and Section 3.1.2 contains discussion regarding monitoring and effectiveness. In sum, the Division will monitor to ensure that the total take of deer does not exceed their target levels for the eight deer management zones. Program safety and the degree to which WS shooting of deer contributes to the Division's achievement of deer population objectives (reductions) will determine the success/effectiveness of the proposed program.